FREEMAN, CRAFT, McGREGOR GROUP

**California Secretary of State
Consultant's Report on:**

**Functional Testing of the
ES&S EVS 5.2.1.0 Voting System**

Prepared for the California Secretary
of State by:

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August 22, 2017

Revision history

Version	Change date	Author(s)	Changes to previous version
1.0	2017-07-011	Paul Craft	Initial Draft
1.1	2017-07-024	Kate McGregor	Revised Draft
1.2	2017-08-22	Craft & McGregor	Response to client review Addition of attachments

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Summary of System Components

The Election Systems & Software (ES&S) EVS 5.2.1.0 Voting System Elections voting system submitted for certification testing consisted of the following components:

Software Modules:

- Election Management System (EMS), comprised of
    - Electionware, Version 4.7.1.0
    - Event Log Service, Version 1.5.5.0
    - Removable Media Service, Version 1.4.5.0
    - Election Reporting Manager (ERM), Version 8.12.1.0
    - Voter Assist Terminal (VAT) Previewer, Version 1.8.6.0
    - ExpressVote Previewer, Version 1.4.1.0
    - ExpressLink, Version 1.3.0.0
    - Paper Ballot, Version 4.6.1.0

Hardware Components:

- DS200 Precinct Tabulator, Hardware Version 1.3, Software/Firmware 2.12.1.0
- DS850 Central Tabulator, Hardware Version 1.0, Software/Firmware 2.10.1.0
- AutoMARK Voter Assistance Terminal (VAT), Hardware Versions 1.0, 1.1, 1.3 and 1.31 Software/Firmware 1.8.6.0
- ExpressVote, Hardware Version 1.0, Software/Firmware 1.4.1.0
- ExpressVote Activation Printer

Scope of Work and Reporting

State certification testing for the EVS 5.2.1.0 consisted of a series of tests in different locations:

a. System installation and benchmarking, California Secretary of State (SOS) office, Sacramento, CA
b. Phase I, Functional Test, CA SOS office, Sacramento, CA
c. Phase II, Functional Test, CA SOS office, Sacramento, CA
d. Security Audit Test, Coherent Cyber office, San Antonio, TX

e. Source Code Review, atsec information security office, Austin, TX
f. Volume Test, Solano County Registrar of Voters, Vote by Mail Processing Center, Fairfield, CA
g. Accessibility Testing, CA SOS office, Sacramento, CA

This report covers the work completed during Phase I and Phase II Functional Tests. Narratives describing the Security Audit Test, Source Code Review, Volume Test and Accessibility Test are presented in separate reports.

We are not attorneys and do not offer legal advice. We have assisted the SOS with collecting facts and evidence in order for them to make certification decisions. However, to advise the SOS on the determination of whether the system complies with California's certification requirements would require an interpretation of law. Accordingly we do not provide recommendations or offer any opinion as to whether the system can be certified.

The work we performed and our findings are strictly limited to the specific serial numbered hardware elements and specific software elements exercised during this test. An inventory of those items is included as Attachment A to this report. The results described in this report should be reliable and repeatable for those specific devices. The decision to apply those results to other machines is solely at the discretion and risk of the Secretary of State and election officials who purchase the system. Although Attachment A can be used as part of a baseline to reach conclusions regarding the compliance of other items, anyone who wishes to determine the compliance of newly purchased systems or the compliance of a system that is already in use should conduct appropriate acceptance testing or system validation analysis to support those conclusions.

Description of System Submitted for Certification

ES&S EVS 5.2.1.0 is a voting system that utilizes paper ballots. The system is comprised of a suite of software applications that provide end-to-end election management functions. These functions include generating election definitions, creating ballot layout, programming voting devices, collecting and consolidating tabulation data, reporting results and producing audit logs. The applications may be installed on a freestanding workstation or in a client and server configuration. The Election Reporting Manager may be installed as a stand-alone workstation or client workstation. The software applications can be set up to support any of the hardware components described below:

The DS200 is a digital scan tabulator that scans and stores a full-page image of the ballot. During tabulation, the images are processed by proprietary mark recognition software. Ballots may be fed to the machine in any orientation. The DS200 is generally used to tabulate ballots in a polling place, but also may be used as a central count device in small jurisdictions.

The DS850 is a high-speed digital scan ballot counter that scans and stores ballot images. It is used in central count operations. As ballots are tabulated, the images are processed by proprietary mark recognition software. This tabulator can out stack write-in ballots and unreadable ballots into separate batches. Ballots may be fed to the machine in any orientation. It is normally used to tabulate mail-in and provisional ballots.

The AutoMARK Voter Assist Terminal is a ballot-marking instrument that accepts unmarked ballots and, through a Direct Recording Electronic (DRE) style touch screen, allows the voter to select, review and correct their choices before the ballot is marked. Once the voter makes their selections, the AutoMARK prints their choices on the ballot. The ballot is returned to the voter and they take it either to one of the precinct scanners or to a ballot box for central tallying. The VAT includes alternative interfaces for voters with disabilities, including enhanced visual and audio presentations of the ballots and support for alternative assistive devices such as large binary switches and sip and puff mechanisms. A voter may also insert a marked ballot and verify that the ballot is marked properly through either a visual screen or an audio ballot playback.

The ExpressVote is a vote capture device that prints a paper cast vote record of the voter's selections that can be scanned by either a DS200 or a DS850. The paper cast vote record is printed on ES&S proprietary thermal card stock. The paper cast vote record may be blank, or it may be preprinted with bar codes indicating the voter's precinct, ballot style and party. The ExpressVote allows the voter to select, review and correct their choices before their choices are printed on the paper cast vote record. After the paper cast vote record is printed, it is returned to the voter who carries it to a precinct scanner or deposits it in a ballot box. The ExpressVote also includes alternative interfaces for voters with disabilities.

In addition to using a VAT, voters can mark their ballots manually with a pen or pencil. The ballots and paper records from the ExpressVote are generally tabulated on a scanner, but in the case of an audit, a recount, or a review by ballot resolution boards they can also be counted manually.

Overview of System Operation

EVS 5.2.1.0 provides an end-to-end suite of software and voting equipment used to conduct elections. The Electionware software module defines an election and creates the media files used by the ExpressVote, DS200 Tabulator, AutoMARK VAT, DS850 Central Ballot Scanner and the ERM software module. A flow chart illustrating the system configuration can be found in Attachment B.

The Election Reporting Manager accumulates and consolidates election results from the DS200 and DS850 tabulators. It generates both paper and electronic reports and can display election results on monitors.

The Event Log Service runs in the background, recording user access and actions performed in Electionware and Election Reporting Manager. The ExpressVote and VAT Previewer applications allow election administrators to preview and proof ballot layouts and to identify any problems before the election is loaded on those devices.

ExpressLink is an application that prints activation cards for the ExpressVote through the ExpressVote Activation Card Printer. It prints bar codes on the activation card that designate the voter's precinct, ballot style, and party. It can be run in standalone mode or be driven by a voter registration system.

Paper Ballot is a tool found in the design module of the Electionware program. It reads information in the election definition database and converts it into finished ballots for the ballot scanners. It can also produce ballot formats that can be printed by ES&S Ballot Services, other authorized printers or local jurisdictions to print extra ballots.

Federal Certification

The United States Election Assistance Commission, Certification Number ESSEVS5210 was issued for EVS 5.2.1.0 on December 18, 2015. The system is a modification to the previously certified system, EVS 5.2.0.0, Certification Number ESSEVS5200 issued on July 2, 2014.

Approach to Testing

Prior to functional testing, the operating system was installed and benchmarks were established. The test procedures outlined by the California Secretary of State require that the hard drives of all computers used during a test are completely wiped and a fresh installation of the operating system is completed. After the hard drives were wiped, the system software and required supporting utilities were installed from trusted installation media following the documentation provided by the vendor. This work was completed during the week of March 20, 2017.   ES&S determined that the configuration of the Dell PowerEdge T630 originally submitted for certification would not adequately serve all California counties. They withdrew that server from the application and replaced it with new configurations of the Dell Power Edge server models T430 and T630 to better serve the diverse population densities among the counties. These machines were built prior to the beginning of Phase II testing.

The functional test was a joint effort shared by consultants, SOS staff and vendor staff. The Freeman, Craft, McGregor Group (FCMG) and SOS jointly managed the test. ES&S provided technical support and witnessed the test. Personnel included:

> FCMG:
> - Paul Craft
> - Kate McGregor
> - Jacob Stauffer
>
> SOS
> - NaKesha Robinson
> - Todd Ross
> - Rodney Rodriguez
>
> ES&S
> - Brooke Thernes

The functional test was divided into two phases. Phase I included the steps necessary to install the system, develop test elections, provide ES&S with the data they require to print test ballots and prepare equipment for Red Team Penetration Test. This work was completed during the week of April 10, 2017. Phase II exercised the system by staging test elections and documenting the results of those elections in accordance with the California Use Procedures. During Phase II, equipment was also prepared for Red Team Penetration Test and benchmark data was established for use in future forensic validation by the California Secretary of State. This work was completed during the week of May 8, 2017.

Test elections used for functional testing included:

- A Primary election based on a Sacramento County election
- A General election based on a Contra Costa County election
- A Primary election based on a Sacramento County election configured for a countywide voter center
- A Recall election
- A Recall election using a contest type of "Recall Question"
- A Ranked Choice election

Scope Limitation

Phase II tests were conducted during the week of May 8, 2017. During that time, it became apparent that ES&S needed to provide additional documentation to set up the system. This documentation included a revised version of the Server Installation Procedures and new appendices to the portions of the Election Programming Guide that deal with Ranked Choice Voting (RCV) Elections, rolling up an election definition from a Primary to a General, and System Limitations. FCMG has reviewed these documents but cannot express an opinion on them. The documentation was not filed with the SOS until June 8, 2017, well after the final round of functional tests was completed. These documents were not available for validation during any phase of the functional test, however, they were subsequently audited and validated by OVSTA staff during the week of August 14, 2017.

Detailed Report on the Phases of Testing

Test servers and workstations that had been previously wiped clean by SOS staff were built during the week of March 20, 2017. The operating system and Commercial Off the Shelf (COTS) software required by the voting system were installed. The machines were configured and hardened according to ES&S specifications and a trusted build of the ES&S EVS 5.2.1.0 applications were loaded. After the servers were configured, they were hashed and images of each machine were taken. Firmware from trusted builds was installed on the hardware apparatus, DS850, DS200, AutoMARK and ExpressVote. ES&S system validation procedures were exercised on one of each of the machine models. During this phase, a number of anomalies occurred. Most were a result of documentation errors, poorly seated hard drives and improperly formatted jump drives. After the software was installed and the machines were configured, the incident log was updated to include the documentation errors.

On March 31, 2017, ES&S announced their decision to withdraw the server models and replace them with Dell Power Edge Server models T430 and T630. The new servers arrived May 8th.

During the week of April 10, 2017, Electionware was exercised on a standalone workstation. The test began by creating a recall election. In Electionware, there is a menu for "Contest Types" that includes a setting for a "Question" and another one for a "Recall Question." The documentation was unclear as to the logical difference between a "Question" and a "Recall Question," so a short, simple test election was developed to exercise the logic. The election was tested on an ExpressVote and it was determined that there is no logical difference between a "Recall Question" and a "Question."

Next, the Recall election was defined. This election was modeled after the October 7, 2003 California Gubernatorial Recall election. The election had one hundred thirty-five candidates with ballot positions and one write-in. This election tests the system's ability to handle a contest with one hundred thirty-five candidates. This ballot is also used to test the hardware's ability to read marginal marks and the consistency of the point at which marginal marks are not read. The election was created following system documentation with no anomalies.

The Primary election configured for a countywide vote center was based on the June 5, 2012 Sacramento Presidential Primary Election. The original election definition was modified to support a countywide, all poll vote center, an absentee collection center and an early all poll vote center. This election simulated the procedure in a county that uses ES&S Election Services to create their election definitions. It was created with no anomalies.

The Primary election configured for precinct and polling place voting was also based on the June 5, 2012 Presidential Primary. The election was scaled down, reducing the number of races and the number of candidates in races in order to test the system functionality required by law without necessitating an excessive number of test ballots. This election also simulated the process in a county that uses ES&S Election Services. It was created with no anomalies.

The General election definition was based on the election held in Contra Costa County on November 6, 2012. This test election was also scaled down from the original in order to test the required system functions without using an inordinate number of test ballots. The election was defined using delimited text files based on candidate, contest, and voter registration data in the county. An anomaly was experienced when the system would not load audio ballot files. Empty wave files that were rejected by the system caused this error. The election definition was completed with no other anomalies.

A fictitious Ranked Choice Vote election was created that allowed the voter three choices for each office. The system does not perform RCV tabulation. Rather, it tabulates the number of votes for each candidate in each ranking and produces a "Cast Vote Record" in a spreadsheet file. This file shows the number of votes cast for each candidate for each ranking on every ballot. The cast vote file can be used to manually tabulate the vote following an RCV tabulation algorithm. This election definition was created with no anomalies. Ballots were tabulated. The cast vote file was created, audited against the ballots cast and found to match the ballots cast.

During the week of May 8, 2017, the two new servers arrived. They were wiped and built following the installation procedures provided by ES&S and Phase II of the functional test was completed.

The Recall election was run on the standalone workstation. Media was burned and loaded onto a DS850 and a DS200. A ballot was prepared using a wide range of marks, including five that complied with the instructions on the first page of the ballot. One mark was made with a marker provided by the vendor. Eighty-six marks were potentially unreadable, or marginal, marks. The expectation was that marks that meet the system specifications will be read with accuracy approaching 100% and marks that are unreadable will be consistently not read and that the range of marginal marks, those marks that are sometimes read and sometimes not, should be fairly narrow. The ballot was scanned ten times on a DS200 and ten times on a DS850. An image of the ballot can be found in Attachment C. Hand written notes to the right of each candidate indicate how many times the mark was read by the DS850 and the DS200. All of the marks that were produced with the recommended type of marker and filled the oval or crossed the center of the oval with a solid line were read correctly every time on both scanners.

The RCV election was run on the standalone workstation. Ballots were scanned and the Cast Vote Record file was produced. The file was opened in Microsoft Excel. Each row of the file contained the selections made on a ballot. The file content was audited against the ballots in the test deck and found to be an exact match.

The ExpressVote does not display the three RCV selections for each contest. Instead, the ExpressVote presents a single page for each ranked choice in a given contest. On an ExpressVote, voting all three rankings in one race requires the voter to navigate through three separate screens

The Primary election was run on the standalone workstation. Media was burned and installed on the hardware. A Logic and Accuracy test was conducted on the DS850 and the DS200 and verified against expected results. When the results from the DS200 were verified, the result for under votes in multiple vote-for contests was reported as the number of votes lost. An unvoted vote for three contest was reported as three under votes. This differed from the results that

were reported by the DS850, where the race was counted as one under vote. An erroneous setting in Electionware caused this anomaly. After this issue was resolved, the Primary election was run. Test ballots were tabulated on the DS200 and DS850 scanners and the polls were closed. Media was transferred to, and consolidated in, ERM and results reports were prepared. The results were audited and matched the expected results.

The Vote Center Primary was run on the client/server with the T630 server. Media was burned for the Vote Center Primary election. The documented limitation for both the ExpressVote and the AutoMARK is 6,400 ballot styles. The test election included 5,284 ballot styles. The object of this test was to verify that Electionware, the precinct and the central count devices could support an election that incorporated a number of ballot styles approaching the maximum without an adverse effect on their performance. The election was run with no anomalies.

The General election was run on the client/server with the T430 server. Media was burned and installed on the hardware. This test was conducted in a manner similar to that of the Primary election. No anomalies occurred. The results were audited and matched the expected results.

AutoMARK and ExpressVote Functionality

In the Primary and General test elections, ballots voted on the AutoMARK and ExpressVote devices were added to the test decks. The AutoMARK ballots included selections that were located near the corners of the ballots, where the machine is most likely to mark outside of the target area if the ballot gets skewed. The expected results for the elections were adjusted to include these ballots. All of the marks produced by the devices matched the voter's input and were read accurately by the scanners. One ballot that was voted on an AutoMARK was mismarked by the machine, which caused the machine to error out. When the anomaly was investigated, the ballot turned out to be defective. One of the timing marks on the side of the ballot had a white space within the mark. This defective timing mark was adjacent to where the ballot was mismarked. The audio ballots were also exercised during voting. The Primary election included three languages, English, Spanish and Chinese. All three languages were incorporated in both the audio and video ballots.

Exercise of the AutoMARK and ExpressVote Accessibility Functions

The AutoMARK and ExpressVote have similar accessible voter interfaces. Both machines offer a touch screen display that is capable of high contrast and magnified displays. The volume and speed at which the audio files are played can be adjusted on each device. Both machines use keypads that provide all of the functions available on the touch screen. The keypad on the

AutoMARK is built into the body of the machine to the right of the touchscreen. The keypad on the ExpressVote is on a stretch cord that can be held by the voter, placed in their lap or placed on an adjacent table. The keypad can also be stowed in a compartment located behind the privacy screen. The touch screen and the keypad for either machine can be operated with one hand, including a closed fist. However, a voter who operates the ExpressVote keypad with one hand may need a poll worker to hold it steady.

Both machines can be operated using accessible binary switches such as a sip and puff device or large paddle switches. They also offer a standard pin plug where a voter may plug in their own binary switch.

The audio ballot and video ballot can work both separately and simultaneously. When the ballot comes up the video ballot is displayed and the audio ballot is running. The keypad includes a "Screen Button" which turns the video ballot on and off. Each time the button is pushed the audio stream notifies the voter whether the screen has been turned on or off.

After the initial instructions are given to the voter and the poll worker has selected the correct precinct and party, the voter is able to operate both devices independently. They can mark their ballot, confirm its content and cast the ballot without assistance. The audio ballot is silent when the poll worker is selecting the precinct and party, as well as during any other actions that are completed by a poll worker. Separate instructions are provided for the audio and video ballots. The instructions shown on the touch screen describe how to vote with the touch screen and the instructions provided by the audio ballot are specific to voting with the accessible keypad. Neither set of instructions provides instructions for a sip and puff device or other binary switches. A voter who uses the video ballot and a binary switch can view the screen, see how the system responds to the switch and learn how to navigate the ballot. It is more difficult for a voter who does not see the screen and relies on only the audio ballot and a binary switch. Although the use of binary switches is infrequent, supplemental instructions should be provided to voters who do use them.

The voter is able to determine the races for which they are eligible to vote, which candidates are in each race and how many candidates may be selected in each race. The voter can review which candidates they have selected at any time by using the review screen or returning to a specific race. The voter may change any selection previously made and confirm the new choice prior to printing the ballot. The system communicates to the voter if they have failed to vote the allowable number of candidates in any race to prevent an unintentional under vote and it prevents the voter from over voting any race.

A voter can use the accessible devices to write in a candidate's name for any contest that allows write-ins. However, if a voter uses the binary switches, this may prove to be time consuming. Both devices allow the voter to proceed through the alphabet as well as use space, backspace, cancel and OK buttons, but these actions are in a continuous string and operate in only one direction. For example, to enter "ZEBRA" using one of these devices requires three rounds through the alphabet, the first to get to Z, and then go back to the beginning so they can select E. In order to get back to B the voter must pass through the remainder of the alphabet and the buttons at the end. Once the B is selected they can proceed down to R, but must go through the remainder of the string to get back to A. This results in a total of 115 button presses or sip and puff motions. After the write-in is complete, the voter can review their input, edit it and confirm that the edits meet their intent.

The voter has to take a clear, identifiable action in order to cast the ballot. The system clearly instructs the voter through this process. Once the ballot is cast, the system confirms that the action occurred and that the process of voting is complete.

Once the ballot is printed, the voter can rescan it and review their selections through either the audio or video option and the system will notify them of any under voted contests. However, if the voter wants to change their printed ballot they must spoil that ballot, get another ballot from a poll worker and re-vote. The AutoMARK instructions instruct the voter to get another ballot from a poll worker. The ExpressVote does not.

Functional Findings

Within the test, the ES&S EVS 5.2.1.0 Voting System performed with no tabulation or reporting errors. Three of the test elections were designed to verify that the system is able to support the types of elections currently held in in California: a Primary, General and Recall. Two additional test elections were designed to verify that the system is able to support elections using countywide, all precinct vote centers and a RCV election.

The system does not perform RCV tabulation, but it creates a Cast Vote Records spreadsheet file. This file can be used to manually tabulate the results or incorporate other software products outside of the system to determine the results. ExpressVote does not display the RCV columns on its touchscreen. Instead, each ranked choice is presented as a single column ballot with one page for each choice so, in a single contest voting each choice requires three screens. This makes the usability less user friendly since, in an election with numerous contests, navigating through multiple pages becomes more complicated and could confuse a voter.

There were a number of errors found in the documentation. The errors were reported to ES&S and they were asked to make the necessary corrections. The revised documentation was received from ES&S on June 8, 2017, and the corrections were subsequently verified.

A new set of instructions was required to configure the Dell servers. In addition, the Election Programming Guide needed new appendices to cover RCV elections, rolling up an election definition from a Primary to a General and System Limitations. These documents were also received on June 8, 2017. The documents were reviewed and they address the subject areas. As stated in the Scope Limitations, these documents arrived after the functional tests were concluded so they were not validated during the functional test. However, they were audited and verified by OVSTA staff during the week of August 14, 2017.

ES&S provided procedures using scripts run in a Linux environment to verify the software and firmware on the AutoMARK, DS200, DS850, ExpressVote and EMS. These procedures were exercised during the functional tests. The scripts are designed to verify ES&S specific files. These scripts are not suitable for a forensic system validation. A confidential analysis and specific recommendations for improving these procedures has been provided to the SOS and ES&S.

Attachment A

Inventory of Components Tested

EMS Server   Small

Vendor	Model	Serial# or Service Tag#
Dell	PowerEdge T430	HZ8SJH2
Dell	Dell 23" Monitor E2316H	CN-0YDPKC-74445-4BI-AXU8
	Wired USB Keyboard and Mouse	

COTS Software

Vendor	Product	Version
Microsoft	Windows Server 2008	R2 /SP1
Symantec	Endpoint Protection 64 Bit	12.1.4
Symantec	Endpoint Protection Intelligent Updater	20151006-037-v5i64.exe
Cerberus	Cerberus FTP Server	6.0.7.1

ES&S Software

Vendor	Product	Version
ES&S	Electionware – Server Installation	4.7.1.0

EMS Server   Large

Vendor	Model	Serial# or Service Tag#
Dell	PowerEdge T630	86KVHH2
Dell	Dell 23" Monitor E2316H	CN-0YDPKC-74445-4BI-AXU8
	Wired USB Keyboard and Mouse	

COTS Software

Vendor	Product	Version
Microsoft	Windows Server 2008	R2 /SP1
Microsoft	WSIS Microsoft Windows Offline Update Utility	8.8
Symantec	Endpoint Protection 64 Bit	12.1.4
Symantec	Endpoint Protection Intelligent Updater	20151006-037-v5i64.exe
Cerberus	Cerberus FTP Server	6.0.7.1

ES&S Software

Vendor	Product	Version
ES&S	Electionware – Server Installation	4.7.1.0

ERM Standalone Workstation   Client 1

Vendor	Model	Serial# or Service Tag#
Dell	Optiplex 5040	14NDC3C2
Dell	Dell 23" Monitor E2316H	CN-0X0Y40-72872-6AQ-A67L-A00
	Wired USB Keyboard and Mouse	
	USB Printer and Drivers	

COTS Software

Vendor	Product	Version
Microsoft	Windows 7 Professional	64-Bit SP1
Microsoft	WSIS Microsoft Windows Offline Update Utility	8.8
Symantec	Endpoint Protection 64 Bit	12.1.4
Symantec	Endpoint Protection Intelligent Updater	20151006-037-v5i64.exe
Adobe	Adobe Acrobat Standard	11
Micro Focus	RM COBOL Runtime	12.06

ES&S Software

Vendor	Product	Version
ES&S	Event Log Service (ELS)	1.5.5.0
ES&S	Removable Media Service (RMS)	1.4.5.0
ES&S	Election Reporting Manager (ERM)	8.12.1.0

EMS Standalone Workstation   Client 2

Vendor	Model	Serial# or Service Tag#
Dell	Optiplex 5040	5KMD3C2
Dell	Dell 23" Monitor E2316H	CN-0X0Y40-72872-6AQ-AC1L-A00
	Wired USB Keyboard and Mouse	
	USB Printer and Drivers	

COTS Software

Vendor	Product	Version
Microsoft	Windows 7 Professional	64-Bit SP1
Microsoft	WSIS Microsoft Windows Offline Update Utility	8.8
Symantec	Endpoint Protection 64 Bit	12.1.4
Symantec	Endpoint Protection Intelligent Updater	20151006-037-v5i64.exe
Adobe	Adobe Acrobat Standard	11
Micro Focus	RM COBOL Runtime	12.06

ES&S Software

Vendor	Product	Version
ES&S	Event Log Service (ELS)	1.5.5.0
ES&S	Removable Media Service (RMS)	1.4.5.0
ES&S	Election Reporting Manager (ERM)	8.12.1.0
ES&S	VAT Previewer	1.8.6.0
ES&S	ExpressVote Previewer	1.4.1.0
ES&S	Electionware - All Components	4.7.1.0

EMS Client Workstation   Client 3

Vendor	Model	Serial# or Service Tag#
Dell	Optiplex 5040	5QMD3C2
Dell	Dell 23" Monitor E2316H	CN-0X0Y40-72872-6AQ-A6EL-

A00

Wired USB Keyboard and Mouse
USB Printer and Drivers

COTS Software

Vendor	Product	Version
Microsoft	Windows 7 Professional	64-Bit SP1
Microsoft	WSIS Microsoft Windows Offline Update Utility	8.8
Symantec	Endpoint Protection 64 Bit	12.1.4
Symantec	Endpoint Protection Intelligent Updater	20151006-037-v5i64.exe
Adobe	Adobe Acrobat Standard	11
Micro Focus	RM COBOL Runtime	12.06

ES&S Software

Vendor	Product	Version
ES&S	Event Log Service (ELS)	1.5.5.0
ES&S	Removable Media Service (RMS)	1.4.5.0
ES&S	Election Reporting Manager (ERM)	8.12.1.0
ES&S	VAT Previewer	1.8.6.0
ES&S	ExpressVote Previewer	1.4.1.0
ES&S	Electionware - Client Installation	4.7.1.0

EMS Client Workstation   Client 4

Vendor	Model	Serial# or Service Tag#
Dell	Dell Optiplex 5040	GMQKD82
Dell	Dell 23" Monitor E2316H	Not Recorded
	Wired USB Keyboard and Mouse	
	USB Printer and Drivers	

COTS Software

Vendor	Product	Version
Microsoft	Windows 7 Professional	64-Bit SP1
Microsoft	WSIS Microsoft Windows Offline Update Utility	8.8
Symantec	Endpoint Protection 64 Bit	12.1.4
Symantec	Endpoint Protection Intelligent Updater	20151006-037-v5i64.exe
Adobe	Adobe Acrobat Standard	11
Micro Focus	RM COBOL Runtime	12.06

ES&S Software

Vendor	Product	Version
ES&S	Event Log Service (ELS)	1.5.5.0
ES&S	Removable Media Service (RMS)	1.4.5.0
ES&S	Election Reporting Manager (ERM)	8.12.1.0
ES&S	VAT Previewer	1.8.6.0
ES&S	ExpressVote Previewer	1.4.1.0

ES&S   Electionware - Client Installation   4.7.1.0

AutoMARK (VAT)

Vendor	Model/Hardware Version/Firmware	Serial#
ES&S	Model A100/HW1.0/1.8.6.0	AM0106431423
ES&S	Model A300/HW 1.3.0/1.8.6.0	AM0308421582
ES&S	Model A200/HW1.1/1.8.6.0	AM02006461961
ES&S	Model A300/HW 1.3.1/1.8.6.0	AM0208490407

DS200 Ballot Scanner

Vendor	Hardware Version/Firmware Version	Serial#
ES&S	1.3/2.12.1.0	DS0316371033
ES&S	1.3/2.12.1.0	DS0315380813
ES&S	1.3/2.12.1.0	DS0315381002
ES&S	1.3/2.12.1.0	DS0315380937
ES&S	1.3/2.12.1.0	DS0315380974
ES&S	1.3/2.12.1.0	DS0316370810

ExpressVote UVD

Vendor	Hardware Version/Firmware Version	Serial#
ES&S	1.0/1.4.1.0	EV0115412606
ES&S	1.0/1.4.1.0	EV0115370012
ES&S	1.0/1.4.1.0	EV0115412382

DS850 Ballot Scanner

Vendor	Hardware Version/Firmware Version	Serial#
ES&S	HW 1.0/2.10.1.0	DS8509420014

Attachment B

Election Systems & Software: EVS 5.2.1.0 – System Configuration

Rev. 1.0   Dept. Certification   Date: 09.25.2015
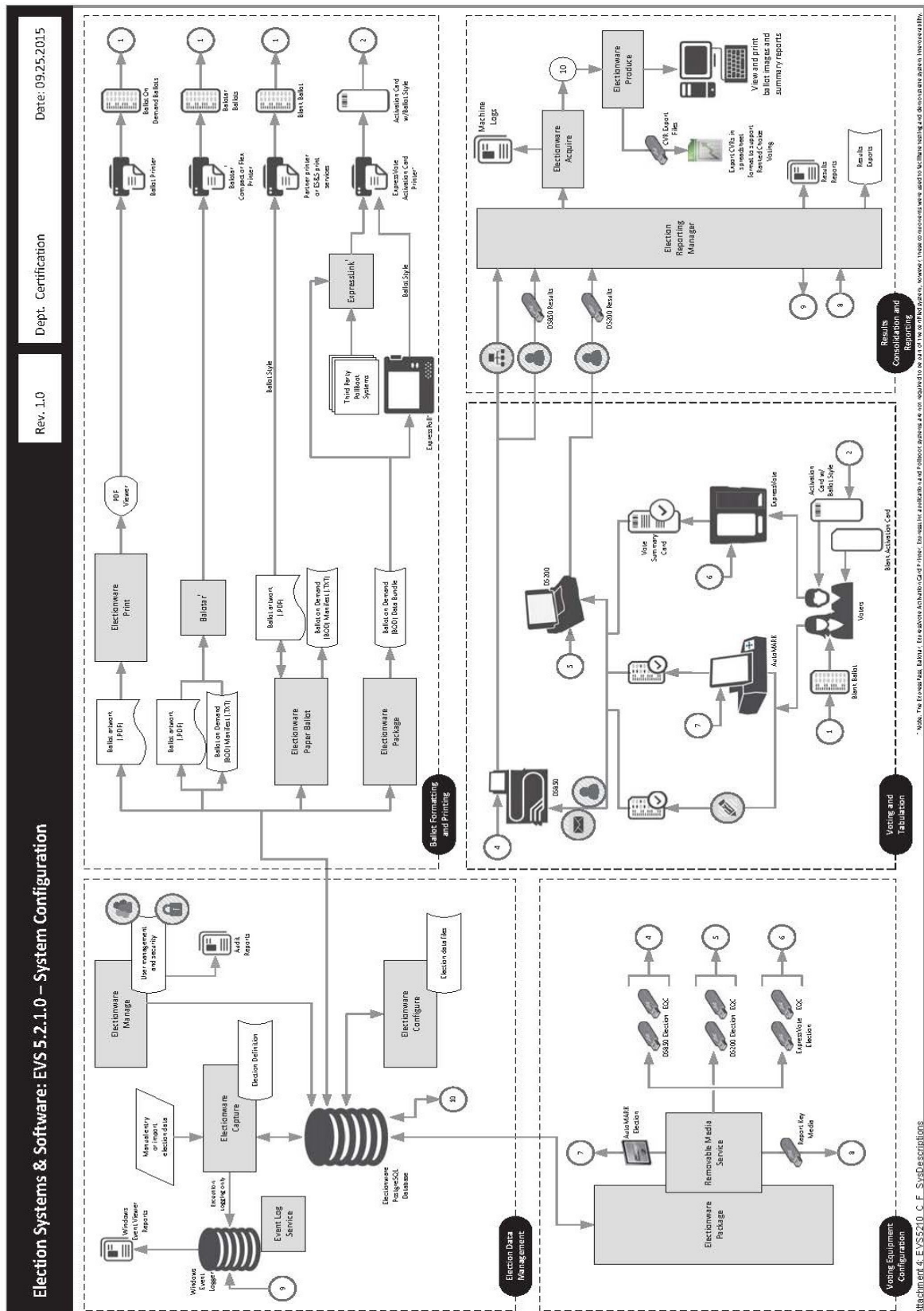
Attachment C

EVS 5.2.1.0 Certification
Marginal Mark Test

Question
Shall Grayy Davis be recalled from the office of Governor?

Yes ○   No ○

Governor
Vote for no more than Eighty

850   200

Candidate	Party		
Iris Adams	Republican	10	10
Brooke Adams	Democratic	10	10
Alex-St James	American Independant	10	10
Douglas Anderson	Peace and Freedom	10	10
Angelyne	Green	10	10
Arif Mohammed	Libertarian	0	0
Badi Badiozamani	NONPARTISAN	0	0
Vik S. Bajwa	Republican	0	0
John W. Beard	Democratic	0	0
Ed Beyer	American Independent	0	0
Vip Bhola	Peace and Freedom	0	0
Cheryl Bly-Chester	Green	10	10
Audie Bock	Libertarian	10	10
Joel Britton	NONPARTISAN ← No	0	0
Art Brown	Republican	10	9
John Christopher Burton	Democratic	1	0
Cruz M Bustamante	American Independant	0	0
Peter Miguel Camejo	Peace and Freedom	0	0
Todd Carson	Green	0	0
William "Bill" S. Chambers	Libertarian	0	0
Michael Cheli	NONPARTISAN	10	10
(Logan Darrow) W Clements	Republican	0	0
Gary Coleman	Democratic	0	0
Mary "Mary Carey" Cook	American Independent	9	10
Robert Cullenbine	Peace and Freedom	0	0
Scott Davis	Green	0	0
Robert "Butch" Dole	Libertarian	10	10
Bob Lynn Edwards	NONPARTISAN	10	10
Warren Farrell	Republican	10	10
Dan Feinstein	Democratic	10	10
Larry Flynt	American Independant	0	0
Lorraine (Abner Zurd) Fontanes	Peace and Freedom	0	10
Gene Forte	Green	10	10
Diana Foss	Libertarian	0	0
Ronald J. Friedman	NONPARTISAN	0	0
Leo Gallagher	Republican	0	0
Gerald Lee Gorman	Democratic	10	10
Rich Gosse	American Independant	10	10
James H. Green	Peace and Freedom	0	0
Jack Lloyd Grisham	Green	0	0
Garrett Gruener	Libertarian	0	0
Joe Guzzardi	NONPARTISAN	0	0
Ivan A. Hall	Republican	0	0

Candidate	Party		
Ken Hamidi	Democratic	10	10
Sara Ann Hanlon	American Independant	0	10
Stephen C. Henderson	Peace and Freedom	0	0
Ralph A. Hernandez	Green	0	0
John J. "Jack" Hickey	Libertarian	0	0
Jim Hoffmann	NONPARTISAN	0	10
Ariana Huffington	Republican	0	0
S. Issa	Democratic	0	0
Michael Jackso	American Independant	10	10
Trek Thunder Kelly	Peace and Freedom	10	10
Edward (Ed) Kennedy	Green	10	10
D. E. Kessinger	Libertarian	10	7
Kelly P. Kimball	NONPARTISAN	0	0
Stephen L. Knapp	Republican	0	0
Eric Korevaar	Democratic	10	10
Jerry Kunzman	American Independent	0	0
Dick Lane	Peace and Freedom	0	0
Gary Leonard	Green	10	10
Todd Richard Lewis	Libertarian	0	10
Calvin Y. Louie	NONPARTISAN	0	0
Frank A. Jr. Macaluso	Republican	10	10
Paul "Chip" Mailander	Democratic	3	1
Robert C. Mannheim	American Independant	0	0
Bruce Margolin	Peace and Freedom	10	10
Paul Mariano	Green	1	6
Gino Martorana	Libertarian	0	0
Mike P. McCarthy	NONPARTISAN	0	0
Bob McLean	Democratic	0	0
Tom McClintock	Democratic	10	10
Dennis Duggan McMahon	American Independent	10	10
Mike McNeilly	Peace and Freedom	10	10
Scott A. Mednick	Green	0	0
Carl A. Mehr	Libertarian	10	10
Johnathan Miller	NONPARTISAN	10	10
Darryl L. Mobley	Republican		
Jeffrey L. Mock	Democratic		
John "Jack" Mortensen	American Independent		
Dorene Musilli	Peace and Freedom		
Paul Nave	Green		
Robert C. II Newman	Libertarian		
Leonard Padilla	NONPARTISAN		
Ronald Jason Palmieri	Republican		
Gregory J. Pawlik	Democratic		
Heather Peters	American Independant		
Charles "Chuck" Jr. Pineda	Peace and Freedom		
Bill Prady	Green		
Darin Price	Libertarian		
Brooke Thernes	Democratic		

Candidate	Party
Paul Craft	Republican
Bruce McDannold	Democratic
Steve Freeman	Republican
Kate McGregor	Peace and Freedom
Todd Ross	American Independant
Alex Padilla	Democratic
Ryan Macias	Republican
Jeff Rodencil	Democratic
Ben Swartz	Republican
NaKesha Robinson	Peace and Freedom
Jacob Stauffer	Republican
Rodney Rodriguez	Democratic
Susan Lapsley	Green
Steve Pearson	Republican
Tom Burt	Republican
John Galt	Libertarian
Micky Mouse	American Independant
Donald Duck	Peace and Freedom
Daisy Duck	Democratic
Scrooge McDuck	Green
Winnie "the" Pooh	Peace and Freedom
Snow White	NONPARTISAN
Prince Charming	Republican
Sleeping Beauty	American Independant
Evil Queen	Democratic
Bambi Deer	American Independant
Thumper Rabbit	Peace and Freedom
Shrek Ogre	Libertarian
Fiona Ogre	Democratic
Fiona Pattinson	Republican
Steve Weingart	Democratic
Herb Deutsch	Libertarian
Tucker Omell	American Independant
Mark Manganaro	Peace and Freedom
Gregg Mendenhall	Green
Ana Queveda	Peace and Freedom
Ronald Regan	Democratic
Richard Nixon	Libertarian
John Kennedy	Republican
Gerald Ford	Green
Jerry Brown	Green
Pete Wilson	Democratic
Pat Brown	NONPARTISAN
Write-in	